

PMTurkeyCOLPEm Resource

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Subject: Information needs
Attachments: TP_InfoNeeds_FSAR2 5 - sent to applicant.docx

Bill;

Attached are the preliminary information needs based on our understanding. These are subject to revision and modification.

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Q	FSAR Subsection	Information Needs
Cuba: Tectonic and structural features, and seismicity		
1	2.5.1.1.1.2.3,	Provide a subject matter expert (SME) to clarify the tectonic context and implications for active faulting of the North Cuba uplifted Holocene marine terraces, visible on 1:500,000 maps of the region and noted in Agassiz, 1894. Please clarify how "unfaulted Pleistocene and younger terraces along the northern edge of Cuba" place limits on timing of faulting along the Cuban Fold-and-Thrust Belt
2	2.5.1.1.1.3.2.2	Provide a subject matter expert (SME) to discuss the implications of seismic reflection features and the presence of deformed/disrupted marine basin sediments over mapped basement faults in Figure 2.5.1-279 for the Plio-Pleistocene activity of the Cuban Fold-and-Thrust Belt:
3	2.5.1.1.1.3.2.4	Provide a subject matter expert (SME) to provide a single figure or composite of figures that clearly depict all Cuban tectonic features discussed in FSAR (missing: Cubitas, Guane, Mipe, Baconao and Habana-Cienfuegos faults).
4	2.5.1.1.1.3.2.4	Provide a subject matter expert (SME) to discuss the explanation for why seismicity continues along the northern portion of Cuba.
5	2.5.1.1.1.3.2.4	<p>Provide a subject matter expert (SME) to discuss the various fault systems of Cuba within the Cuba areal source (such as Nortecubana, Hicacos, Cochinos, Surcubana, Las Villas, La Trocha faults) with respect to:</p> <ul style="list-style-type: none"> • Seismic reflection interpretations and surface trace or projection of faults with respect to earthquakes, topography and bathymetry (as applicable) • Discuss the young fault line scarps along the Las Villas fault • Discuss Quaternary activity and seismicity associated with faults.
6	2.5.1.1.1.3.2.4	Provide a subject matter expert (SME) to discuss the Nortecubana and the Pinar fault zones and any potential relationship to the February 1914 earthquake (Mw 6.2) offshore northeastern Cuba near the Nortecubana fault and to the January 1880 earthquake near the Pinar fault in western Cuba. The SME should be prepared to discuss the conclusions that the fault is recently active by others (Gordon et al. (1996); Meyerhoff and Hatten (1974)). For the Las Villas fault, discuss the 1939 event (Reference 494 Cotilla-Rodríguez) and address the alignment of epicenters (Figure 2.5.1-267)
7	Figure 2.5.1-251	Provide a subject matter expert (SME) to discuss the Matanzas fault zone. Include the relationship between the Matanzas fault zone and elevated Pleistocene terraces along the coast near Matanzas and nearby seismicity.
8	2.5.1.1.1.3.2.4	Provide a subject matter expert (SME) to discuss existing geologic mapping of Cuba. Clarify if available geologic mapping in Cuba is suitable for neotectonic fault evaluation.

Q	FSAR Subsection	Information Needs
Variation in crustal thickness - nature and thickness variations of oceanic crust associated with the East Coast Margin Igneous Province (ECMIP)		
9	2.5.1.1	Provide a subject matter expert (SME) to (1) discuss the location of the ECMIP with respect to transitional continental, thickened and normal oceanic crust and the location of the carbonate bank system and the current continental bathymetry and (2) discuss the potential that the magnetic highs located along the eastern portions of the Little Bahamas Bank and Bahamas Platform are related to the LIP or ECMIP
Florida and Bahamas Platform; Tectonic and Structural features		
10	2.5.1.1.1.3.2.2	Provide a subject matter expert (SME) to discuss Santarem Anticline (SW edge Bahamas Platform) in light of References 477, 479, and 501 which suggest that the anticline is currently undergoing shortening and in addition is cored by a thrust fault
11	2.5.1.1.1.3.2.2	Provide a subject matter expert (SME) to discuss the Straits of Florida Normal Faults (southern tip of peninsula, south of Keys), including a review of Uchupi, 1966 and Malloy and Hurley, 1970.
12	2.5.3.2	Provide a subject matter expert (SME) to discuss the fault on Figure 2.5.1-253 which shows a fault within 25 miles of the site in light of your statement: "Published geologic mapping at a range of scales show no bedrock faults mapped within the site vicinity".
13	2.5.3.2	Provide a subject matter expert (SME) to discuss possible faults identified in the McGregor Isles area. Provide borehole logs, cross-sections, and maps pertinent to these possible faults from reference 230.
14	2.5.1.1.1.3.2.2	Provide a subject matter expert (SME) to discuss the faulted nature of Cretaceous strata on the Bahamas Platform in Figure 2.5.1-264 in light of FSAR Section 2.5.1.1.1.3.2.2 describing Cretaceous rocks as undeformed.
15	2.5.1.1.1.3.2.2	<p>Provide a subject matter expert (SME) to discuss the following regarding Walkers Cay fault.</p> <ul style="list-style-type: none"> • Is there a growth trend of progressive offset with age of strata across the Walkers Cay fault that declines at a rate that indicates fault movement ceased before Holocene? • Information contained in profiles LBB-17 and LBB-18 of ODP Leg 101 (Austin et al, 1988).

Q	FSAR Subsection	Information Needs
Karst Phenomena - limestone dissolution processes and the resulting features near TPNPP		
16	2.5.1.1.1.1.1.1	Provide a subject matter expert (SME) to discuss the potential for carbonate dissolution processes associated with fresh-water/brine interfaces to occur in southern Florida (Mylroie and Carew, 2003; Smart et al, 2006).
17	2.5.1.2.4	Provide a subject matter expert (SME) to discuss the likely origins of subsurface voids found in the Key Largo LS and the Fort Thompson Formation.
18	2.5.3.8.2.1	Provide a subject matter expert (SME) to discuss the presence of features that are apparent on the sea floor of Biscayne Bay within 3 km to the east of Units 6 and 7. What potential is there for buried solution cavities formed at similar elevations below Units 6 and 7?
Holocene geologic record and tsunami/storm surge deposits		
19	2.5.1.1.1.2.1.1	Provide a subject matter expert (SME) to discuss the sediment types retrieved from Blackwater Bay and the significant event at ~ 1000 years before present.
20	2.5.1.1.1.2.1.1	Provide a subject matter expert (SME) to discuss the onshore deposits associated with Hurricane Andrew (1992) and place into context of the Holocene sedimentary record at the site and other paleostorm deposits (Swiadek, J. W., 1997).
21	2.5.1.1.2.3.2.2	Provide a subject matter expert (SME) to discuss large earthquakes on the Northern Hispaniola (August, 1946), the Septentrional (1842) and Enriquillo (April, 1860) faults that generated tsunami waves. The SME should be prepared to clarify the geographic extent of this respective tsunami.
22	2.5.1.1.5, 2.5.1.1.5, FSAR 2.5.1.2.1, and 2.5.1.2.	Provide a subject matter expert (SME) to discuss the Holocene section in the site area. The SME should be prepared to discuss the muck layer with included calcareous silts and organic content that varies in thickness across the site.
Quaternary Geology		
23	Table 2.5.1-203	Provide a subject matter expert (SME) to discuss Florida Marine Terraces in light of more recent information (Muhs, D.R., et al., 2011).

Q	FSAR Subsection	Information Needs
Site Geology		
24	Figures 2.5.1-342, 344, and 343	Provide a subject matter expert (SME) to discuss the construction and interpretation of the isopach and structure contour maps for the site vicinity.
Seismic Sources		
25	2.5.2.4.4.3	Provide a subject matter expert (SME) to discuss the SSHAC Level 2 process used in developing the new Caribbean seismic sources. Especially the makeup of the TI teams, the peer review panels, how the experts' opinions were integrated into the development of the final models, whether any conflicting opinions between the experts were dealt with, and how the final models represent the informed consensus of the community
26	2.5.2.1	Provide a subject matter expert (SME) to discuss the selection of mb and Mw for Phase I and II earthquake catalogs updates. What impacts, if any, did different magnitude scales have on the PSHA study.
27	2.5.2.2.6	Provide a subject matter expert (SME) to discuss the attempts made to identify potential contributing EPRI seismic sources that are outside the site region
28	2.5.2.4.2	Provide a subject matter expert (SME) to discuss the rationale for using only a test region to assess the validity of the EPRI earthquake recurrence rates
29	2.5.2.3	Provide a subject matter expert (SME) to discuss the correlation of seismicity with all seismic sources used in the Turkey Point PSHA study
30	2.5.2.4.3.2	Provide a subject matter expert (SME) to discuss: (1) the Mmax update procedures and (2) justification for using the magnitude of the largest observed earthquake in lower-bound Mmax estimates
31	2.5.2.1	Provide a subject matter expert (SME) to discuss (1) earthquake catalog development efforts, (2) Phase I and Phase II updates, (3) rationale for temporal and spatial boundary selections
32	2.5.2.4	Provide a subject matter expert (SME) to discuss the lack of discussions in the FSAR about the USGS national seismic hazard map seismic sources and their relevance to the EPRI seismic source zone updates
33	2.5.2	Provide a subject matter expert (SME) to discuss seismic source model differences presented in Subsection 2.4.6 and 2.5.2 (e.g., Hispaniola fault)

Q	FSAR Subsection	Information Needs
Ground Motion		
34	2.5.2.4.6	Provide a subject matter expert (SME) to discuss seismic sources used in the PSHA study and corresponding GMPEs. Which sources used which GMPEs?
35	2.5.2.4.5	Provide a subject matter expert (SME) to discuss the SSHAC Level 2 process used in developing the Caribbean GMPEs. Especially the makeup of the TI teams, the peer review panels, how the experts' opinions were integrated into the development of the final models, whether any conflicting opinions between the experts were dealt with, and how the final models represent the informed consensus of the community
36	2.5.2.4.5	Provide a subject matter expert (SME) to discuss the applicability of the ground motion prediction model parameters developed by Motazedian and Atkinson (2005) to the tectonic environment between the Turkey Point site and the Caribbean sources, especially the Cuba areal source
PSHA		
37	2.5.2.4.6	Provide a subject matter expert (SME) to discuss the details of the PSHA implementation for the Cuba areal seismic source zone
38	2.5.2.4.4.4	Provide a subject matter expert (SME) to discuss the a and b values of the supplemental seismic sources used within the site region
39	2.5.2.4.4.3.2	Provide a subject matter expert (SME) to discuss the decision not to incorporate the impact of very distant seismic sources on the site hazard calculations
40	2.5.2.4.6	Provide a subject matter expert (SME) to discuss the contribution of the Cuba areal seismic source to the total site hazard and further assessments of the deaggregation results
Site Response/GMRS		
41	2.5.2.5	Provide a subject matter expert (SME) to discuss the appropriateness of using eight deep wells located between approximately 100km and 180km away from the site to develop the site response model.
42	2.5.2.5.3	Provide a subject matter expert (SME) to discuss the Site Response Analysis and procedures used, with special emphasis on site model development, GMRS elevation selection, and kappa value determinations
43	2.5.2.6	Provide a subject matter expert (SME) to discuss the applicability of RG 1.60 V/H ratios for the TP site

Q	FSAR Subsection	Information Needs
44	2.5.2.5.1	Provide a subject matter expert (SME) to discuss the rationale for the use of the EPRI gravel curve to represent the backfill in site response calculations
Geologic Features		
45	2.5.4.1	Provide a subject matter expert (SME) to discuss potential dissolution activity in the limestone formation. The SME should be prepare to discuss the microgravity data and the anomalies associated with sinkholes that may be present at the site.
Properties of Subsurface Materials		
46	2.5.4.2	Provide a subject matter expert (SME) to discuss the variations and adjustments to the recommendations in RG 1.132 (FSAR Subsection 2.5.4.2.2). The SME should be prepared to discuss the following adjustments made to the subsurface investigation: (1) changes to the types of field testing locations; and (2) depths and frequencies of sampling.
47	2.5.4.2	Provide a subject matter expert (SME) to discuss FSAR Table 2.5.4-209 "Summary of Recommended Geotechnical Engineering Parameters and FSAR Table 2.5.4-205 "Summary of General Physical and Chemical Properties Test Results". The SME should be prepared to discuss: (1) SPT N-Values and associated correction factors, (2) accuracy of the defined properties for thick sublayer units, (3) correlations used and assigned values for elastic modulus, (4) uncertainties in deriving these values and, (5) not providing results in FSAR Table 2.5.4-205 for the Fort Thompson formation
48	2.5.4.2	Provide a subject matter expert (SME) to discuss the adequacy of RCTS tests for characterizing Stratum 5 and 6 soils.
49	2.5.4.2	Provide a subject matter expert (SME) to discuss laboratory test methods and results for subsurface materials. The SME expert should be prepared to discuss: (1) limestone's stress-strain characteristics and (2) triaxial testing performed to soil samples, and (3) the error in referenced Table 2.3 of Reference 257.
50	2.5.4.2	Provide a subject matter expert (SME) to discuss the assumed values of Poisson's ratio that were used to convert P-wave data to S-wave data for material deeper than 600 ft. The SME should be prepared to discuss the uncertainty in this computational process and potential variability in the resulting shear wave velocity profiles used to evaluate site response and potential building behavior.

51	2.5.4.2	Provide a subject matter expert (SME) to discuss the adequacy of friction angle generated from correlations using SPT and CPT data and.
Geophysical Surveys		
52	2.5.4.4	Provide a subject matter expert (SME) to discuss data presented in Figure 2.5.4-220. The SME should be prepared to discuss the characterization of uncertainty in shear wave velocity below 150 ft.
53	2.5.4.4	Provide a subject matter expert (SME) to discuss data presented in Figure 2.5.4-218 (plot of shear wave velocity measurements). The SME should be prepared to discuss the values of the velocities obtained for the silty sands and clays located below the Key Largo formation.
Excavations and Backfill		
54	2.5.4.5	Provide a subject matter expert (SME) to discuss the following regarding the structural concrete backfill in which nuclear islands are going to be founded: (1) definition of "Lean Concrete" (2) ACI standards and specifications (3) concrete's cracking potential; (4) load transfer mechanism between the base of the NI structures and the lean fill concrete as well as the load transfer between the lean concrete and the surrounding supporting soils; (5) concrete durability to resist chemical attack and abrasion; and (6) possible differential settlements due to erosion and loss of concrete strength due to leaching.
55	2.5.4.5	Provide a subject matter expert (SME) to discuss if any permanent dewatering system and program will be implemented after construction.
56	2.5.4.5	Provide a subject matter expert (SME) to discuss the safety significance of the MSE wall that will be placed around the perimeter of the plant area.
57	2.5.4.5	Provide a subject matter expert (SME) to discuss FSAR Figure 2.5.4-222. Specifically, the SME should be prepared to: (1) discuss the procedure that will be followed during site excavation and construction activity to ensure that appropriate strata for proposed foundation locations are confirmed through objective measures and the exposed foundation laying surface is uniform; (2) provide vertical and horizontal extent of all seismic categories I excavations, fills, and slopes, including the locations and limits of excavations, fills, and backfills on plot plans and geologic sections and profiles, and (3) identify any and all offsite sources for fill material

58	2.5.4.5	Provide a subject matter expert (SME) to discuss the use of generic curves for the dynamic properties of the crushed limestone backfill. The SME should be prepared to provide additional explanation to justify the use of these generic curves.
Groundwater Conditions		
59	2.5.4.6	Provide a subject matter expert (SME) to discuss chemical testing for groundwater including pH, chloride, and sulfate.
Response of Soil and Rock to Dynamic Loading		
60	2.5.4.7	Provide a subject matter expert (SME) to discuss the actual level of damping used to develop the GRMS. The SME expert should be prepared to discuss the discrepancies in assigned damping values between FSAR 2.5.2 and 2.5.4.
Liquefaction Potential		
61	2.5.4.8	Provide a subject matter expert (SME) to discuss the assessment used in the liquefaction analyses to compute the factor of safety (FOS) against liquefaction. Specifically, the SME should be prepared to: (1) clarify on what earthquake motions were used in the liquefaction analysis, (2) clarify if the additional proposed 25 feet of structural fill were considered in the analysis, (3) justify not providing a quantitative liquefaction analysis for the structural fill placed immediately adjacent to the nuclear island structures.
Static Stability		
62	2.5.4.10	Provide a subject matter expert (SME) to discuss the assumptions and parameters used in the bearing capacity calculations.
63	2.5.4.10	Provide a subject matter expert (SME) to discuss details regarding the settlement calculations.
64	2.5.4.10	Provide a subject matter expert (SME) to discuss the seismic lateral earth pressure analysis. Specifically, the applicant should be prepared to discuss the following: (1) why horizontal seismic coefficient $k_h = 0.1g$ was used with no combined vertical coefficient, (2) the definition of the design ground motion used in the analysis.